November 16, 2010

Mike O'Herron
Montana Department of Natural Resources and Conservation
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Sent via email to: dnrchcp@mt.gov

Dear Mr. O'Herron:

Thank you for the opportunity to comment on DNRC's final environmental impacts statement (EIS) and Habitat Conservation Plan (HCP); we also greatly appreciated the one-month extension onto the comment period, which was extremely helpful.

Please accept these comments on behalf of the Wilderness Society (http://wilderness.org), a non-profit conservation organization whose 500,000 members and supporters nationwide, including more than 2,600 Montana residents, attach tremendous value to the forests, watersheds, and wildlife species affected by your proposed Habitat Conservation Plan.

While we appreciate the amount of time and effort that DNRC invested in the development of this Habitat Conservation Plan (HCP), we believe that the plan has significant shortcomings in a number of areas, and needs to be strengthened significantly to fulfill the obligations of the Endangered Species Act (ESA), the National Environmental Policy Act, the Montana Environmental Policy Act, and DNRC's own state forest land management plan. Shortcomings in all aspects of planning for the continuing impacts of climate change on the State of Montana's land trust resources under this HCP would impair the ability of the DNRC to fulfill its mission over the course of the next 50 years (i.e. "...produce revenue for the trust beneficiaries while considering environmental factors and protecting the future income-generating ability of the land"), and so are a particular concern for our organization and members.

We are concerned that the proposed HCP is deficient in the following areas:

1. The HCP ignores current and predicted impacts of climate change in Montana;
2. The concept of "adaptive management" presented in the HCP is, unfortunately, incorrectly formulated both in concept and in planned implementation, and is in need of a significant revision;
3. Not knowing precisely how climate change will affect our public lands in the future does not mean that managers should continue under "business as usual" management models developed before the onset of climate change; rather, land managers have become skilled at accounting and planning for sources of uncertainty over the past 50 years, and climate change can and should be incorporated into those existing processes.
4. The absence of plans to mitigate the adverse effects of climate change on the five HCP species listed does not comply with the ESA requirement that any take of the HCP species be "minimized and mitigated to the maximum extent practicable"; and

5. The proposed fifty year lifetime of this plan is unjustifiably long, especially when the significant and uncertain effects of climate change within the project area are considered for this time period. Instead, we recommend a maximum ten-year lifetime for this plan.

Here, we request that the DNRC adopt a significantly-strengthened Alternative 3 to resolve these problems, as described in our comments below. We have organized our comments under the five areas listed above. Please note that all references cited below can be found in Appendix I.

1. **The HCP ignores current and predicted impacts of climate change in Montana (despite acknowledging a subset of these impacts in the Draft and Final EIS).**

(a) In 5.11 of the Draft EIS, DNRC acknowledges that future impacts of climate change on *water resources* (5.11.1) and *biodiversity and habitat* (5.11.2) are expected to be significant:

> *Water resources*: "...Impacts on water resources are predicted to be a disruptive effect of climate change in Montana." "...some changes can be expected during the 50-year Permit term. In the semi-arid regions of the West, small changes to the snowmelt runoff cycle are sufficient to shift annual water levels from near-drought to drought and have a substantial impact (RMCO 2005)."
>
> "When combined, these conditions will likely cause drought, which in turn will cause other, secondary effects. Forest productivity and habitat suitability may decrease, and the frequency and severity of wildfires, as well as the spread of forest pathogens and disease, will likely increase."
>
> *Biodiversity and habitat:* "...Climate change is expected to lead to the loss of native species from extensive areas and result in increasingly scarce and fragmented populations in many others (Ruggerio et al., 2008). ...As temperatures warm and peak runoff shifts to earlier in the year, it is likely that stream temperatures will rise. Habitat for cold-water aquatic species will decrease... For species like bull trout that depend on cold, clean, connected streams, the shift towards warmer temperatures and lower water levels will jeopardize their health."
>
> "Drought and increased wildfire activity will likely provide sufficient disruption to allow insects and diseases to establish themselves in forests (USGRCP 2001). ...Land uses, particularly forest management and development in outlying areas, are also likely to change in response to the effects of climate change on frequency and severity of wildfires and groundwater and surface water resources. The area burned by wildfire in Canada is expected to increase by 74 to 118 percent in the next century (Flanigan et al., 2004), and similar increases seem likely for the western United States."
>
> "Specific tight relationships between predators and their prey (e.g. between lynx and hares, or between goshawks and red squirrels) will break apart as the species respond differently to climate change (Ruggerio et al., 2008)."

In the Final HCP, the section on Climate Change has been shortened, and previous references to participation by DNRC members in a Montana State Climate Change Advisory Committee have been struck and replaced with: "The DNRC staff is discussing the ramifications of climate change on the management of forested lands"; that is, the DNRC appears to be doing less to address this major issue than it was a few months ago.

Despite acknowledgment of predicted impacts from climate change, the DNRC in no way considers the potential ramifications of these impacts on the forests and imperiled species residing on DNRC lands over the course of the next 50 years.

(b) Furthermore, scores of peer-reviewed scientific publications about the **current** impacts of climate change in the Northern Rockies are readily available to the DNRC for use in the planning process, and were provided on a CD and in the reference section of our last set of comments on the draft HCP, although not included in the Final HCP. For example, well-documented current impacts from the literature include:

- Increases in air temperatures: Over the course of the past 100 years, the average air temperature in Montana has increased 2.8^0 F. During this time, minimum winter temperatures have increased significantly, as have maximum summer temperatures (Barnett et al., 2008; Saunders et al., 2006; Saunders et al., 2008; Global Climate Change Impacts in the United States, 2008). Under the A1B scenario created by the Intergovernmental Panel on Climate Change (IPCC), further increases of 3.0^0 F. are expected in the West by 2050 (IPCC 2007 Report).
- Declining water resources: The hydrological cycle of the western United States has changed significantly over the course of the last 50 years. Evidence for this dramatic shift includes increased drought events, decreasing snowpack (15-30% over past 50 years), melting of glaciers and permanent snowfields, a greater proportion of annual precipitation falling as rain rather than snow during the winter, earlier snowmelt dates in Spring, and decreasing streamflows throughout the summer months (Barnett et al., 2008; Cook et al., 2004; Mote et al., 2005; Mote, 2006; Moore et al., 2007; Saunders and Maxwell, 2005). All of these factors are considered to be indications of "a coming crisis in water supply for the western United States" (Barnett et al., 2008; Global Climate Change Impacts in the United States, 2008), which is of particular concern for residents and public lands managers of the historically semi-arid state of Montana.
- More frequent and severe wildfires: Higher air temperatures and earlier Spring snowmelt dates correspond directly to significant increases in wildfire frequency in the West. Furthermore, large wildfire activity increased significantly in the 1980's in the West, leading to larger fires, longer fire durations and fire seasons that were, on average, 78 days longer each year. Between 1987 and 2003, the average area burned by large forest fires (>400 ha) in the West was six times the area burned from 1970-1986 (Westerling et al., 2006; Running, 2006; (Barnett et al., 2008; Global Climate Change Impacts in the United States, 2008). The total area burned annually in Rocky Mountain forests is predicted to increase 175% from 2046-2055 relative to 1996-2005 (Spracklen et al., 2009).
- Declining forest health: Not surprisingly, the dramatic changes in temperature, hydrology, and wildfire patterns summarized above have led to equally dramatic and adverse effects on forest health and ecosystem function throughout the West (including Montana). First, mortality rates in healthy coniferous stands have tripled (from 0.2% to 0.6%) over the past several

decades; this is thought to be directly related to increases in the length of the summer drought (due to reduced snowpack and streamflows), and to warmer air temperatures causing higher rates of evaporative loss. Second, new growth is often failing to replace dying trees, meaning that smaller trees could become more dominant in forests over time, substantially changing the structure of forests, as well as the ability of these ecosystems to support wildlife. Third, significant and rapid losses in native plant species have been observed recently (e.g. sudden aspen tree decline) (van Mantgem et al., 2003; Bigler et al., 2007; Battles et al., 2008; Hogg et al., 2008; Schrag et al., 2008; Global Climate Change Impacts in the United States, 2008; Saunders et al., 2006). Fourth, a changing climate increases the amount of suitable habitat available for invasive weeds, and wildfire is one of the primary mechanisms of invasion for a number of noxious weed species. For example, there is a distinct possibility that the area currently occupied by the invasive weed, cheatgrass, could expand by 45% by 2100 (Bradley, 2009).

- Severe pine bark beetle outbreaks: Currently, a severe pine bark beetle outbreak is underway in seven different Western states (Montana, Idaho, Wyoming, Colorado, Utah, Oregon, Washington) as well throughout British Columbia; the severity of this outbreak has been linked to increases in regional air temperatures (Ben Pierce, Bozeman Chronicle, August 6, 2009). Although not mentioned in the DNRC Draft EIS and HCP, this epidemic has had extremely important effects on forest structure throughout Montana: the Forest Service Northern Region's Health Protection Team just released their 2009 estimate of tree loss in Montana, which was two million acres (John Cramer, Ravalli Republic, September 16, 2009).

(c) **Given that the current impacts of climate change within Montana's forests are already significant and well-documented, management plans for forests and HCP species on DNRC lands must consider these impacts thoroughly in any EIS and HCP before targets for lumber extraction are developed. Without identifying specific mitigation measures for climate change in the Draft HCP, DNRC cannot assert that other impacts (such as timber activities) on forest health, crucial watersheds, and HCP species have been evaluated adequately.** As DNRC noted in their Draft HCP (Section 1.3.2.3): "Conservation strategies that promote only a short-term management focus are not practicable for a long-term business operation, such as forest management on trust lands". Unfortunately, detailed planning for climate change impacts on DNRC lands is necessary to successfully achieve the goal of long-term sustainability in Montana's forests.

2. **The concept of "adaptive management" presented in the HCP is, unfortunately, incorrectly formulated both in concept and in planned implementation, and is in need of a significant revision;**

(a) Scores of peer-reviewed papers also suggest ways of developing specific strategies and plans to ameliorate the effects of climate change on public lands and endangered or threatened wildlife species. Recommendations (e.g. Brennan, 2008; Mawdsley et al., 2009) include:

- incorporating predicted climate-change impacts into species and land-management plans and activities,
- reducing non-climate stressors on species at risk,
- evaluating and enhancing monitoring programs for wildlife and ecosystems,
- improving management to facilitate resilience (e.g. riparian plantings to shade streams to offset localized warming),
- protecting movement corridors and refugia, and
- defining key indicators of ecosystem function prior to undertaking activities designed to keep those variables within acceptable parameters.

Of particular importance among these recommendations is the crucial role of adaptive monitoring (Lindenmayer and Likens, 2009). Scientific publications that examine the effectiveness of a variety of approaches to multi-species conservation are also available for use in planning processes such as those being undertaken by the DNRC (e.g. Carroll et al., 2009).

(b) Adaptive management is a systematic approach for improving resource management by learning from management outcomes, and regularly incorporating the results of a comprehensive monitoring program into revisions of management strategies. A good adaptive management approach includes specific details of existing conditions for landscapes and wildlife populations; specific management goals and objectives that will be used to reach the desired condition; treatments; details of the monitoring program; and the changed circumstances that will lead to revisions of management strategies for each landscape and wildlife population. **The current plan in the HCP does not meet these requirements, creating a need for significant revision in this part of the planning process.**

(c) **DNRC is in an excellent position to implement several of the above recommendations given the extremely large stand-level inventory (SLI) that they have maintained for many years.** Section 1.3.3.2 of the Draft HCP notes that the "SLI covers more than 1.2 million acres of DNRC land, which includes 726,000 acres of forest land and exceeds 34,500 individual map polygons. Each forested polygon has a data record that provides information about the forest tree species, size, stocking level, potential vegetation class, productivity, and management objectives for a particular timber stand. …Inventories are conducted regularly by DNRC staff for planned and completed timber projects."

Hence, the DNRC has already created a system and infrastructure for monitoring forest health, which allows staff to comprehensively evaluate the effects of climate change on forest health on a subset of these plots. We recommend that the DNRC analyze this large, long-term dataset to provide the quality and quantity of information needed for the suggested revision of the Draft HCP.

(d) We would like to point out that our expectations for DNRC's planning processes are no different than those for other agencies. That is, other state and federal agencies are already well into the process of developing plans to mitigate the effects of climate

change on the forests, watersheds, and imperiled species entrusted to their care. A few examples include:

- Washington State Department of Natural Resources: We include this example from the state of Washington (http://www.dnr.wa.gov/Pages/default.aspx) since the mission and state mandate of this agency closely resemble that of Montana's DNRC. The Washington State DNRC is in the midst of "aggressively" and actively incorporating planning and mitigation measures for climate change into their daily activities given that these efforts have been judged of paramount importance to the agency, as highlighted on their website:

  "The DNR has led efforts to develop strategies to adapt to a changing environment on public lands. We are continuing this effort in partnership with the Departments of Ecology, Agriculture, Commerce, universities, and others to develop a state-wide climate change adaptation strategy that will address issues related to fire prevention and suppression, pest and disease outbreaks, global and local economic factors, water availability, and plant genetic preservation and development."
  [http://www.dnr.wa.gov/ResearchScience/Topics/OtherConservationInformation/Pages/climate_change.aspx]

  "The Department of Natural Resources is working with other agencies to develop a state-wide strategy for climate adaptation and also developing an internal climate adaptation strategy that engages all affected programs and agency activities. A Climate Adaptation Strategy outlines an approach to dealing with the potential effects of climate change on Washington's natural environment and resources.

  Almost all DNR programs will be affected by climate change, and must therefore consider how best to adapt. The impacts of climate change on Washington's natural resources will have profound economic and social impacts. An effective climate change adaptation strategy must be based on sound science and take into account the economic, environmental, and cultural impacts of each recommendation."
  [http://www.dnr.wa.gov/ResearchScience/Topics/OtherConservationInformation/Pages/cc_climate_change_adaptation.aspx]
- Department of the Interior: launched a major climate strategy initiative on September 15th, 2009 (Juliet Eilperin, Washington Post), which created a new climate change response council that coordinates action among the department's eight bureaus and offices. The result has been the rapid development of Climate Science Centers around the country with associated scientific resource delivery systems in place, in combination with U.S. Fish & Wildlife Landscape Conservation Collaboratives, which provide a wealth of assistance, partnerships, tools and resources for agency staff (http://www.fws.gov/pacific/climatechange/lcc.html). The Great Northern LCC (in which the state of Montana falls), is a particular well-developed example of this model.
- United States Forest Service: has created their own Climate Change Resource Center for public lands managers. The website has a wide array of tools, publications, links to other informational sites, etc. for use in developing plans to mitigate the effects of climate change on forests and imperiled species (http://www.fs.fed.us/ccrc).
- Montana Fish, Wildlife and Parks: has assembled a Montana Fish, Wildlife and Parks Climate Adaptation Working Group and is currently in the midst

of a series of workshops to develop management plans and specific actions for a diversity of wildlife species under several climate change scenarios.

- United States Fish and Wildlife Service: has developed a climate change strategy that will "guide the agency's efforts to respond to the unprecedented threat posed by global warming"; the plan is currently open for public comment (http://www.fws.gov/home/climatechange). One of the three key elements of this plan is adaptation, which they define as "helping to reduce the impacts of climate change on fish, wildlife, plants, and their habitats".

3. **Not knowing precisely how climate change will affect our public lands in the future (Section 6-13 of the HCP) should not be interpreted to mean that managers should continue under "business as usual" management models developed before the onset of climate change. Rather, land managers have become skilled at accounting for and planning for sources of uncertainty in forest ecosystems over the past 50 years, and climate change can and should be incorporated into these existing planning processes.**

(a) Public land managers regularly account for four different kinds of uncertainty during planning processes: (i) environmental variation, (ii) uncertainty about resource status, (iii) uncertainty about the difference between the actions targeted by decision makers and the actions that are actually implemented, and (iv) lack of understanding and/or agreement about the structure of biological and ecological relationships that drive resource dynamics. Incorporating uncertainty about climate change in specific and concrete ways under this existing framework is entirely possible and currently underway on public lands across the United States: a wide variety of planning tools and resources are available to inform this process (e.g. Nature Serve vulnerability assessment tool, "Informing Decisions in a Changing Climate", a report by the National Research Council; "Voluntary Guidance for States to Incorporate Climate Change into State Wildlife Action Plans and Other management Plans (http://ncseonline.org/00/Batch/WHPRP/Boulder%20Presentations/Climate%20Change%20Guidance%20Document_FINAL_Sept%2021.pdf); "Adaptive Management: The U.S. Department of the iNterior Technical Guide" (http://www.doi.gov/initiatives/AdaptiveManagement/documents.html)).

(b) The Western Governors' Association (in their June, 2010 publication: "Climate Adaptation Priorities for the Western States: Scoping report", http://www.westgov.org/index.php?option=com_content&view=article&id=128&Itemid=62) specifically discusses the fact that impacts from climate change are already being observed in Western states, and are expected to accelerate. "To build resilience to these impacts, the Western states will need to factor climate change into resource management plans and strategies," but use "smart climate adaptation practices into resource management and decision making, given the inherent uncertainty in projections of future impacts."

(c) For example, the Department of Defense has been dealing with imperfect information for centuries, and is now applying this approach to their incorporation of climate change into planning processes: "While political leaders on Capitol Hill seek definitive answers about how quickly the world's climate will change, military and national security experts say they're used to making decisions with limited information. 'Are we going to wait for perfect data? No," said Rear Admiral David

Titley, who heads the Navy's Task Force on Climate Change. "Not only the Department of Defense, but any successful organization doesn't wait for perfection.'" ("Defense experts want more explicit climate models", 6/24/2010 news article on www.eenews.net).

4. **The absence of plans to mitigate the adverse effects of climate change on the five HCP species listed does not comply with the ESA requirement that any take of the HCP species be "minimized and mitigated to the maximum extent practicable".** This is particularly critical for the five HCP species, especially in light of reports in the scientific literature verifying the fact that climate change hastens wildlife population extinctions (McLaughlin et al., 2002).

5. **While we understand that DNRCs in many states have traditionally carried out detailed plan on a fifty-year time scale, it is now overwhelmingly clear from both the scientific literature and work by many state and federal agencies across the country that this is no longer a viable option given the continuing and accelerating effects of climate change on our public lands and wildlife species. Present and future impacts from climate change necessitate periodic revisions of the plan, and the incorporation of results from rigorous monitoring programs into the revision of management strategies at regular, short-term intervals (e.g. every 3-5 years). For these reasons, we strongly suggest that the HCP undergo a mandatory review every ten years.**

Lastly, I would like to offer my assistance to the DNRC in any way that might make sense to DNRC staff. As Climate Associate for the Wilderness Society, I am responsible for:

- Continuing to review of the scientific literature to locate peer-reviewed articles on the regional impacts of climate change on a wide variety of topics (e.g. temperature, precipitation, snowpack, streamflow, glaciers, forest health, wildfires, invasive weeds, wildlife diseases, endangered/threatened species, trout fisheries, pine bark beetle outbreaks, adaptation methods and tools),
- summarizing current knowledge about the local effects of climate change in factsheets for use by public lands managers in updating/revising management plans,
- developing an interactive website on the regional impacts of climate change for use by public lands managers and the general public.
- The Wilderness Society has also facilitated recently-completed research on the regional effects of climate change to address the information needs of Montana's public lands and wildlife managers. Professor Steve Running (of the University of Montana in Missoula), a recipient of the 2007 Nobel Prize for his work on climate change, has completed a model outlining predicted changes in air temperature and precipitation patterns in the Northern Rockies up to 2100 for the Crown of the Continent. We will be sharing these data and models with public lands managers throughout the region for their use in developing management plans.

In short, we recognize the magnitude of the challenge facing land managers with regard to climate change, and look forward to working with you as we all collectively try to identify viable solutions.

Thank you for the opportunity to comment, and we look forward to continuing to work with DNRC and USFWS to improve this important plan as needed to ensure the health and persistence of the forests, watersheds, and wildlife species on these lands.

Sincerely,

Anne A. Carlson, Ph.D.
Climate Associate

Cc: Montana Field Office, U.S. Fish and Wildlife Service

Appendix I: References

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